US009141315B2

(12) **United States Patent**
Kanemoto

(10) **Patent No.: US 9,141,315 B2**
(45) **Date of Patent: Sep. 22, 2015**

(54) **PRINTING SYSTEM UPLOADING JOB STORED ON PRINTER TO SERVER**

(71) Applicant: **BROTHER KOGYO KABUSHIKI KAISHA**, Nagoya, Aichi (JP)

(72) Inventor: **Ayako Kanemoto**, Nisshin (JP)

(73) Assignee: **BROTHER KOGYO KABUSHIKI KAISHA**, Nagoya, Aichi (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/475,898**

(22) Filed: **Sep. 3, 2014**

(65) **Prior Publication Data**

US 2015/0092219 A1 Apr. 2, 2015

(30) **Foreign Application Priority Data**

Sep. 30, 2013 (JP) 2013-203150

(51) **Int. Cl.**
G06F 3/12 (2006.01)
H04N 1/00 (2006.01)

(52) **U.S. Cl.**
CPC ***G06F 3/121*** (2013.01); ***G06F 3/1234*** (2013.01); ***H04N 1/00244*** (2013.01); *H04N 2201/0093* (2013.01)

(58) **Field of Classification Search**
USPC 358/1.14
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2008/0239375 A1* 10/2008 Okajima 358/1.15
2008/0239383 A1* 10/2008 Okajima 358/1.15
2011/0013215 A1* 1/2011 Yonezawa et al. 358/1.14
2012/0250080 A1* 10/2012 Ohtake 358/1.15
2013/0335778 A1 12/2013 Sugiyama

FOREIGN PATENT DOCUMENTS

JP H11-203068 A 7/1999
JP 2006-295347 A 10/2006
JP 2008-283666 A 11/2008
JP 2013-257728 A 12/2013

* cited by examiner

Primary Examiner — Ngon Nguyen
(74) *Attorney, Agent, or Firm* — Scully, Scott, Murphy & Presser P.C.

(57) **ABSTRACT**

The present invention provides a server including: a communication unit; a storage unit; and a controlling unit. The communication unit is configured to communicate with a printer. The controlling unit is configured to store a job in association with error data in the storage unit upon receiving the job and the error data from the printer via the communication unit. The error data indicates details of an error that has occurred when the printer is executing the job.

10 Claims, 5 Drawing Sheets

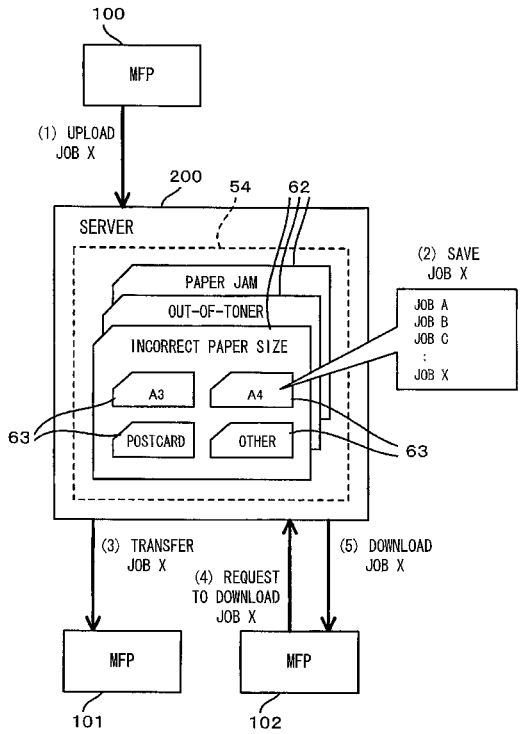


FIG.1

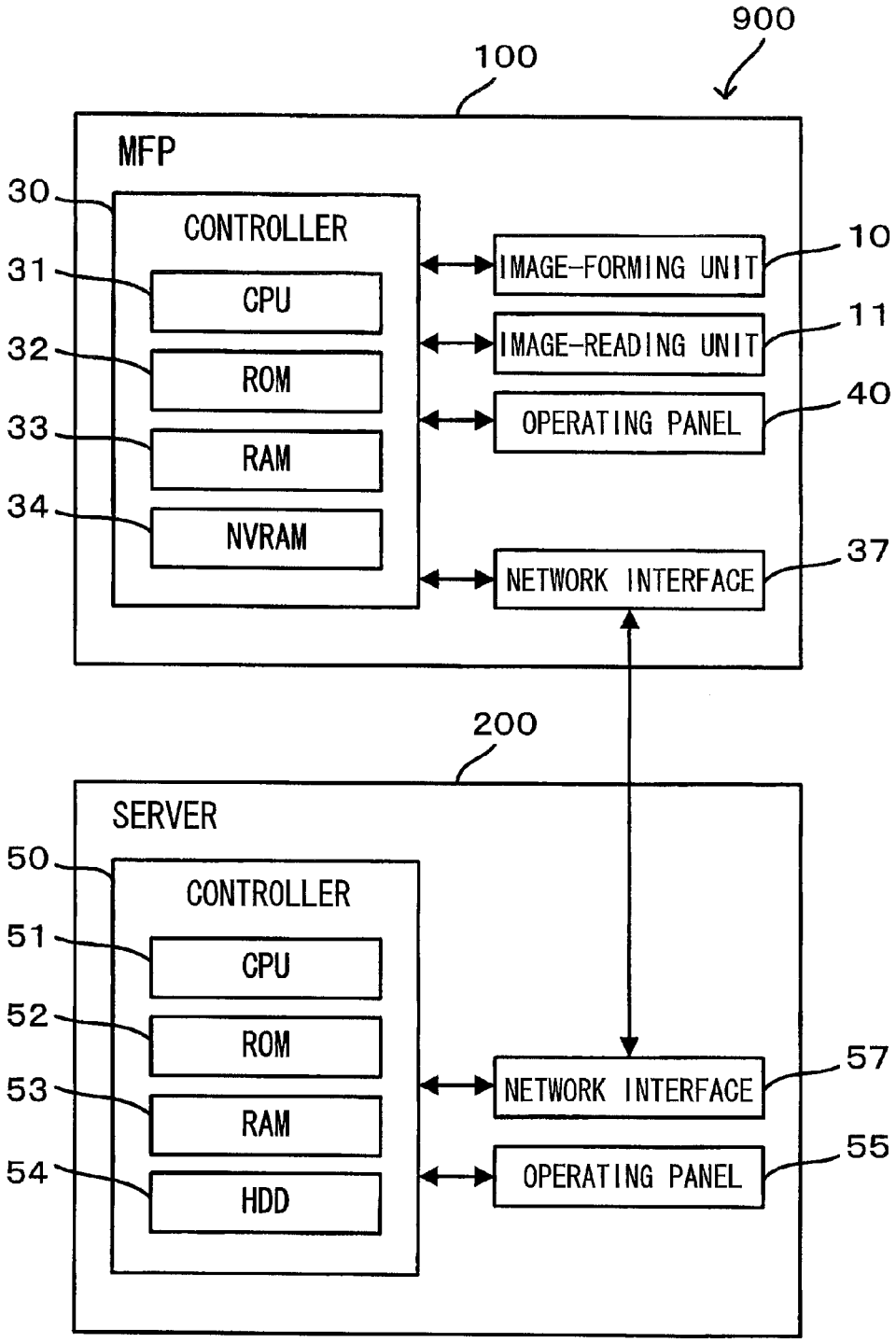

900
100
MFP
30
CONTROLLER
31
CPU
32
ROM
33
RAM
34
NVRAM
IMAGE-FORMING UNIT
10
IMAGE-READING UNIT
11
OPERATING PANEL
40
NETWORK INTERFACE
37
200
SERVER
50
CONTROLLER
51
CPU
52
ROM
53
RAM
54
HDD
NETWORK INTERFACE
57
OPERATING PANEL
55

FIG.2

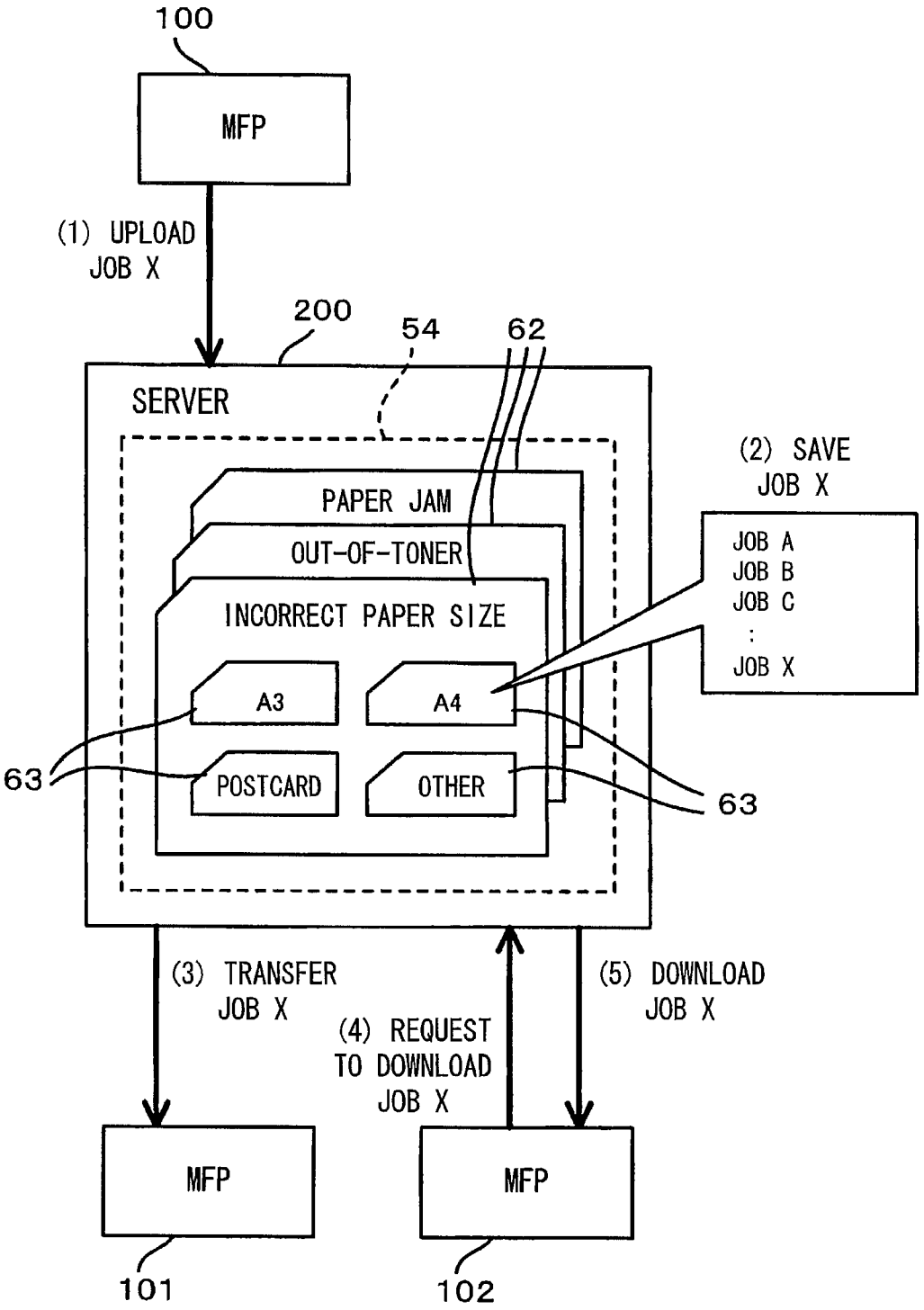

100
MFP
(1) UPLOAD JOB X
200
54
62
SERVER
PAPER JAM
OUT-OF-TONER
INCORRECT PAPER SIZE
A3
A4
POSTCARD
OTHER
63
63
(2) SAVE JOB X
JOB A
JOB B
JOB C
:
JOB X
(3) TRANSFER JOB X
(4) REQUEST TO DOWNLOAD JOB X
(5) DOWNLOAD JOB X
MFP
MFP
101
102

FIG.3

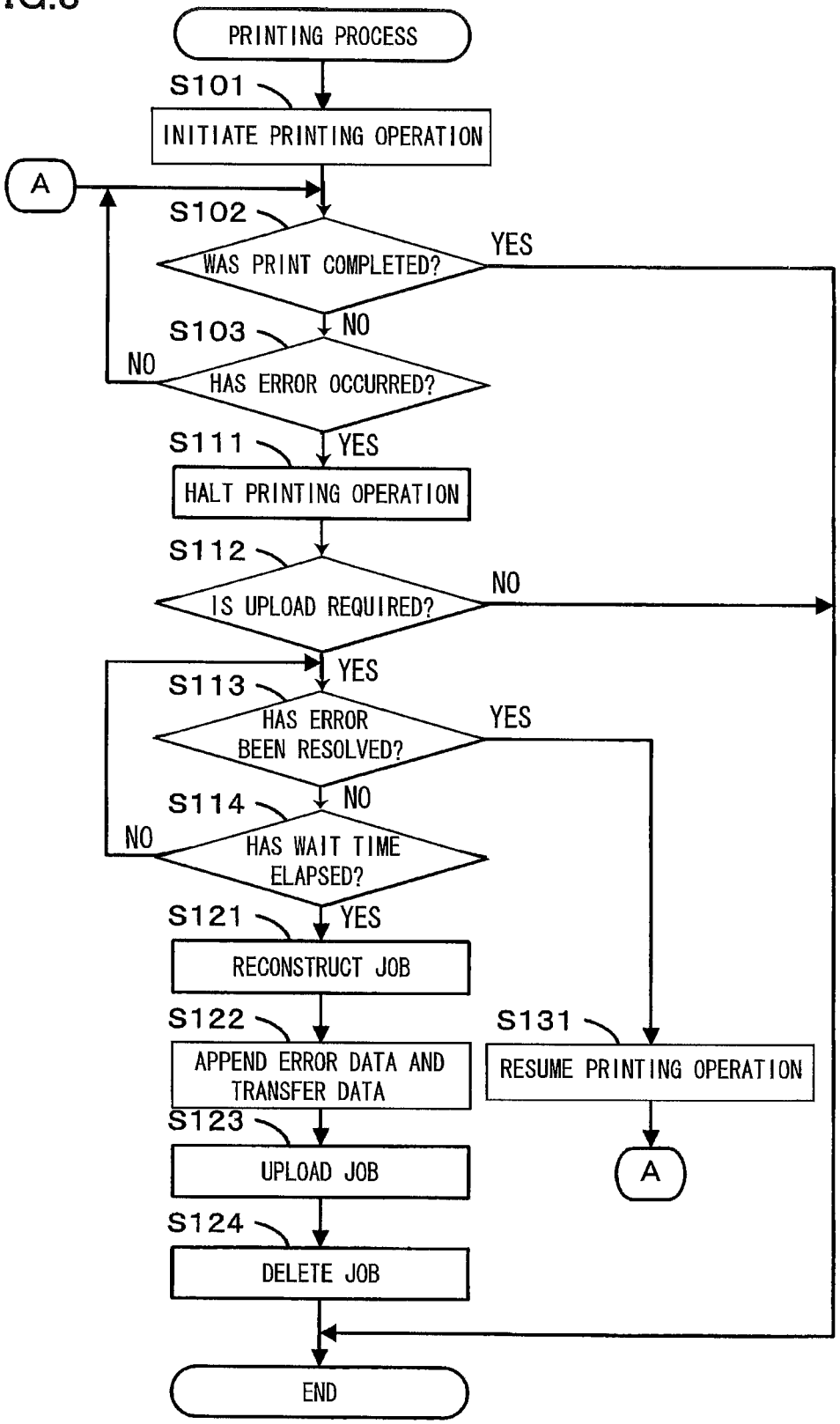

PRINTING PROCESS
S101
INITIATE PRINTING OPERATION
A
S102
WAS PRINT COMPLETED?
YES
NO
S103
HAS ERROR OCCURRED?
NO
YES
S111
HALT PRINTING OPERATION
S112
IS UPLOAD REQUIRED?
NO
YES
S113
HAS ERROR BEEN RESOLVED?
YES
NO
S114
HAS WAIT TIME ELAPSED?
NO
YES
S121
RECONSTRUCT JOB
S122
APPEND ERROR DATA AND TRANSFER DATA
S123
UPLOAD JOB
S124
DELETE JOB
S131
RESUME PRINTING OPERATION
A
END

FIG.4

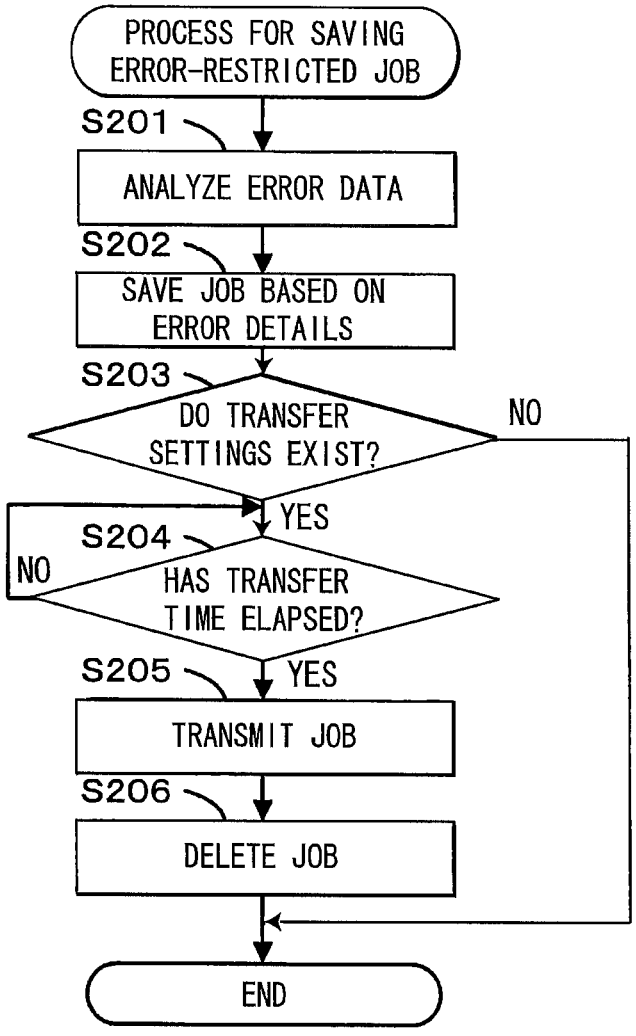
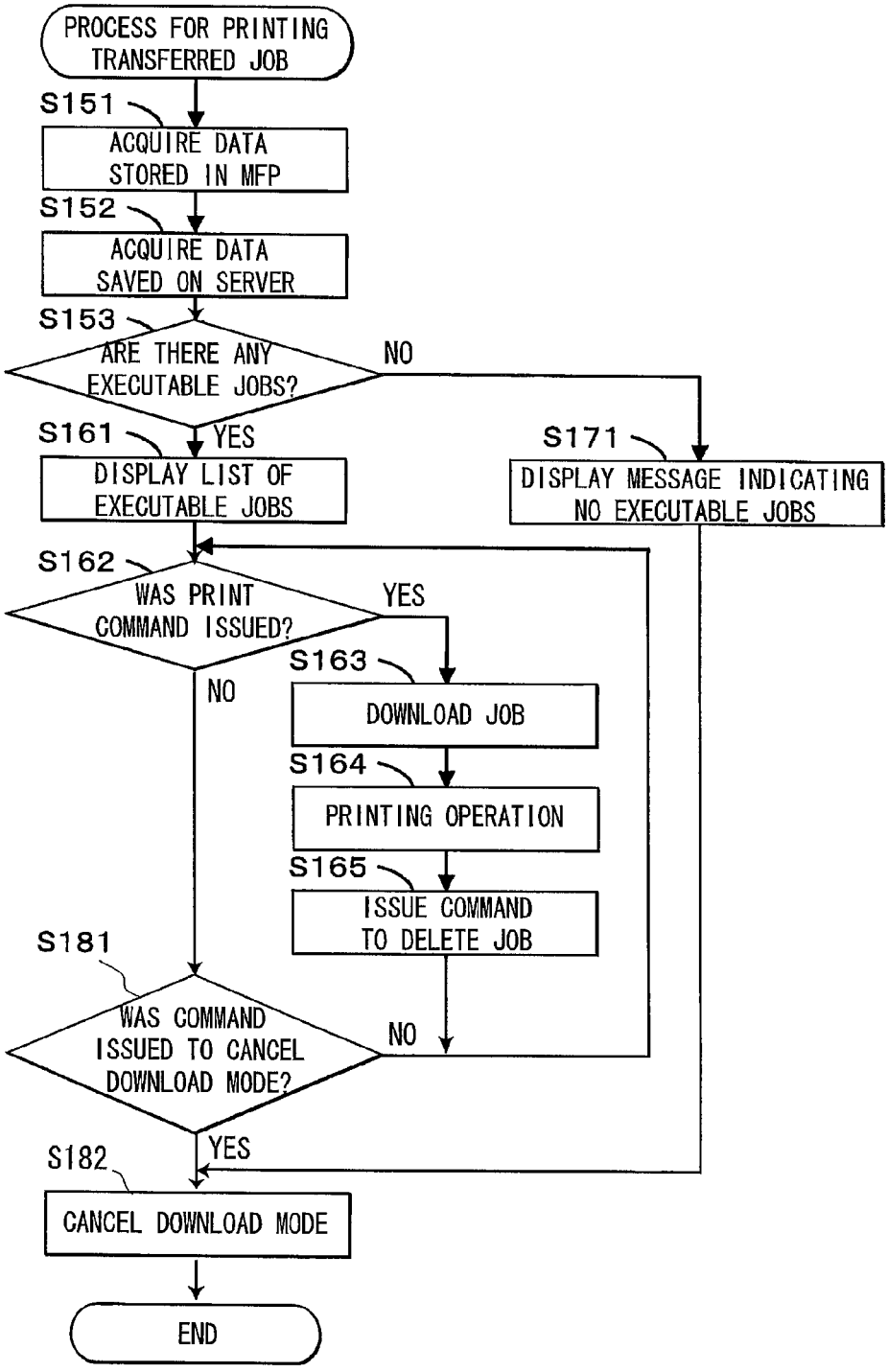

PROCESS FOR SAVING ERROR-RESTRICTED JOB
S201
ANALYZE ERROR DATA
S202
SAVE JOB BASED ON ERROR DETAILS
S203
DO TRANSFER SETTINGS EXIST?
NO
YES
S204
NO
HAS TRANSFER TIME ELAPSED?
S205
YES
TRANSMIT JOB
S206
DELETE JOB
END

FIG.5


PROCESS FOR PRINTING TRANSFERRED JOB
S151
ACQUIRE DATA STORED IN MFP
S152
ACQUIRE DATA SAVED ON SERVER
S153
ARE THERE ANY EXECUTABLE JOBS?
NO
YES
S161
DISPLAY LIST OF EXECUTABLE JOBS
S171
DISPLAY MESSAGE INDICATING NO EXECUTABLE JOBS
S162
WAS PRINT COMMAND ISSUED?
YES
NO
S163
DOWNLOAD JOB
S164
PRINTING OPERATION
S165
ISSUE COMMAND TO DELETE JOB
S181
WAS COMMAND ISSUED TO CANCEL DOWNLOAD MODE?
NO
YES
S182
CANCEL DOWNLOAD MODE
END

PRINTING SYSTEM UPLOADING JOB STORED ON PRINTER TO SERVER

CROSS REFERENCE TO RELATED APPLICATION

This application claims priority from Japanese Patent Application No. 2013-203150 filed Sep. 30, 2013. The entire content of the priority application is incorporated herein by reference.

TECHNICAL FIELD

The present invention relates to a printing system possessing a printer and a server, and more particularly to a technique for uploading a job stored on the printer to the server when an error occurs on the printer.

BACKGROUND

Conventionally, printing systems possessing a printer and a server have employed a technique such as that described in Japanese Patent Application Publication No. H11-203068 for saving the job being printed on the printer to the server when an error occurs during the printing operation and for subsequently returning the saved job to the printer once the error has been resolved to resume the printing operation.

SUMMARY

However, this conventional technology presents the following problem. Namely, it is preferable to be able to identify the cause of the error for each job saved on the server in order to avoid the same error from recurring upon resuming the printing operation on the saved job.

In view of the foregoing, it is an object of the present invention to provide a technique for resolving the problem inherent in the conventional technology by helping the user identify the cause of the error for each job that was saved on the server due to an error occurring.

In order to attain the above and other objects, the present invention provides a server that may include: a communication unit; a storage unit; and a control unit. The communication unit may be configured to communicate with a printer. The control unit may be configured to store a job in association with error data in the storage unit upon receiving the job and the error data from the printer via the communication unit. The error data may indicate details of an error that has occurred when the printer is executing the job.

According to another aspect, the present invention provides a printer that may include: a communication unit; a printing unit; and a control unit. The communication unit may be configured to communicate with a server. The control unit may be configured to: control the printing unit to execute a job; terminate execution of the job upon detecting an error when the printing unit is executing the job; and upload the job and error data to the server via the communication unit. The error data may indicate details of the error.

According to still another aspect, the present invention provides a printing system that may include: a server; and a printer. The printer may include: a printer communication unit; a printing unit; and a printer control unit. The printer communication unit may be configured to communicate with the server. The printer control unit may be configured to: control the printing unit to execute a job; terminate execution of the job upon detecting an error when the printing unit is executing the job; and upload the job and error data to the server via the printer communication unit. The error data may indicate details of the error. The server may include: a server communication unit; a storage unit; and a server control unit. The server communication unit may be configured to communicate with the printer. The server control unit may be configured to store the job in association with the error data in the storage unit upon receiving the job and the error data from the printer via the server communication unit.

BRIEF DESCRIPTION OF THE DRAWINGS

The particular features and advantages of the invention as well as other objects will become apparent from the following description taken in connection with the accompanying drawings, in which:

FIG. **1** is a block diagram showing a printing system according to an embodiment of the present invention;

FIG. **2** is an explanatory diagram showing an example of saving uploaded print jobs in a server according to the embodiment;

FIG. **3** is a flowchart illustrating steps in a printing process executed by an MFP;

FIG. **4** is a flowchart illustrating steps in a process for saving an error-restricted job executed by the server; and

FIG. **5** is a flowchart illustrating steps in a process for printing a transferred job executed by the MFP.

DETAILED DESCRIPTION

Next, a printing system according to a preferred embodiment of the present invention will be described while referring to the accompanying drawings wherein like parts and components are designated by the same reference numerals to avoid duplicating description. In this embodiment, the present invention is applied to a printing system having a multifunction peripheral (MFP) that possesses a printing function, and a server for saving at least some jobs for which an error has occurred.

[Overall Structure of the Printing System]

FIG. **1** shows a printing system **900** according to the preferred embodiment serving as an example of the printing system of the present invention. The printing system **900** includes an MFP **100** as an example of the printer of the present invention, and a server **200** as an example of the server of the present invention. In the printing system **900** of the preferred embodiment, if an error occurs on the MFP **100** that restricts execution of a print job, the print job whose execution is restricted is uploaded to the server **200**. Note that any number of printers in addition to the MFP **100** may be connected to the server **200**.

[Structure of the MFP]

Next, the general structure of the MFP **100** will be described. As shown in FIG. **1**, the MFP **100** includes a controller **30** possessing a CPU **31**, a ROM **32**, a RAM **33**, and a nonvolatile RAM (NVRAM) **34**. The MFP **100** also includes an image-forming unit **10** for printing images on paper, an image-reading unit **11** for reading images from originals, an operating panel **40** for displaying the operating status of the MFP **100** and for accepting input from a user, and a network interface **37** for enabling the MFP **100** to communicate with other devices connected to the MFP **100** via a local area network (LAN) cable. The CPU **31** controls the image-forming unit **10**, image-reading unit **11**, operating panel **40**, and network interface **37**. Note that the controller **30** in FIG. **1** having the CPU **31** and the like collectively denotes all hardware used to control the MFP **100** and is not limited to a single piece of hardware in the MFP **100**.

The image-forming unit **10** may be capable of performing color printing or only monochrome printing. In this embodiment, the image-forming unit **10** is capable of performing color printing. Further, the image-forming unit **10** may employ an electro-photographic printing system or an inkjet printing system. The image-forming unit **10** is an example of the printing unit of the present invention. Further, the image-reading unit **11** may be capable of performing color scans or only monochrome scans. In this embodiment, the image-reading unit **11** is capable of performing color scans. Further, the image-forming unit **10** may employ a CCD reading mechanism or a CIS reading mechanism.

The ROM **32** stores various settings, initial values, and the like, as well as firmware, which is a control program for controlling the MFP **100**. The RAM **33** and NVRAM **34** are used as work areas in which various control programs are loaded, or as storage areas for temporarily storing data.

The CPU **31** controls the various components of the MFP **100** by reading control programs from the ROM **32**, executing the control programs while storing process results in the RAM **33** or NVRAM **34** based on the execution of these control programs and signals received from various sensors. The CPU **31** is an example of the control unit of the printer and the printer control unit according to the present invention. Note that the controller **30** may also be considered the control unit of the printer and the printer control unit.

The network interface **37** is hardware for executing communications with devices connected to the MFP **100** via a LAN cable. For example, the MFP **100** can output an upload request to the server **200** via the network interface **37** and can download data in the same manner. The network interface **37** is an example of the communication unit of the printer and the printer communication unit according to the present invention.

The operating panel **40** is provided on the outer case of the MFP **100**. The operating panel **40** includes various buttons for receiving user input, and a touchscreen for displaying messages and settings. The buttons may include an OK button through which the user inputs a command to start printing, and a cancel button by which the user inputs a command to cancel printing, for example. The user can also perform input operations by touching the touchscreen. For example, the user may input print settings or select a job to be printed through the touchscreen.

[Structure of the Server]

Next, the overall structure of the server **200** will be described. As shown in FIG. **1**, the server **200** includes a controller **50** having a CPU **51**, a ROM **52**, a RAM **53**, and a hard disk drive (HDD) **54**. The server **200** also includes an operating panel **55** having a touchscreen that possesses both a display function and an input function, and a network interface **57** that enables the server **200** to communicate with an external device. The CPU **51** controls both the operating panel **55** and the network interface **57**. Note that the controller **50** in FIG. **1** having the CPU **51** and the like collectively denotes all hardware used to control the server **200** and is not limited to a single piece of hardware in the server **200**.

Software installed on the HDD **54** includes an operating system (OS), a browser for viewing data on the Internet, and a device driver that controls various devices. The HDD **54** also stores print jobs that are uploaded from printers, such as the MFP **100**. The HDD **54** is an example of the storage unit according to the present invention.

The CPU **51** reads control programs from the ROM **52** and programs from the HDD **54** and executes these programs to implement various processes while storing computation results in the RAM **53** or HDD **54**. The CPU **51** is an example of the control unit of the server and the server control unit according to the present invention, but the controller **50** itself may be considered the control unit of the server and the server control unit.

As with the network interface **57** in the MFP **100** described above, the network interface **57** in the server **200** is hardware that serves to communicate with devices connected to the server **200** via a LAN cable. For example, the server **200** can exchange print jobs with the MFP **100** through the network interface **57**. The network interface **57** is an example of the communication unit of the server and the server communication unit according to the present invention.

[Overview of Operations for Handling Errors]

Next, the operations of the printing system **900** performed to handle an error occurring on the MFP **100** while the MFP **100** is executing a print job X will be described with reference to FIG. **2**. For this example, it will be assumed that the sheet size set in print job X is A4-size, and an "incorrect paper size" error has occurred in the MFP **100**. Further, MFPs **101** and **102** have equivalent functions to those of the MFP **100**.

When the "incorrect paper size" error occurs on the MFP **100** while the MFP **100** is printing print job X, the MFP **100** restricts printing of print job X. After the occurrence of the error, the MFP **100** in the printing system **900** of the preferred embodiment first uploads print job X to the server **200** ((1) in FIG. **2**). When uploading print job X, the MFP **100** adds error data and transfer data. The error data indicates the details of the error that has occurred, such as the type of error and details about the type of error. The details of the error type may include print settings at the type of the error's occurrence. The transfer data is required for transferring print job X to another printer through the server **200** and may include data indicating whether transfer settings have been provided, data specifying a destination printer for the transfer, and data specifying the transfer time, i.e., the time at which the transfer is to begin.

After print job X has been uploaded onto the server **200**, the CPU **51** of the server **200** saves print job X on the HDD **54** at a storage location determined from the details of the error data appended to print job X in order to distinguish print job X from other jobs ((2) in FIG. **2**). The server **200** in the preferred embodiment is provided with a folder **62** for each type of error. Each folder **62** further includes folders **63** for other relevant details of each error type as needed. The CPU **51** then stores print job X in the folder matching the error data appended to print job X.

In the example of FIG. **2**, the folders **62** provided for error types include folders **62** respectively corresponding to an "incorrect paper size" error, an "out-of-toner" error, and a "paper jam" error. The folder **62** for "incorrect paper size" further includes folders **63** for each paper size that can be set in the print settings. In this example, folders **63** are provided for "A3," "A4," and "postcard" sizes, with an "other" folder **63** provided for all other paper sizes. Alternatively, a folder may be provided for each paper tray. The other folders **62** may include different folders **63** from those described above. For example, the "out-of toner" folder **62** may include a folder **63** for each toner color.

Thus, the CPU **51** of the server **200** searches for the folder that matches the error details based on the error data appended to the print job. When the server **200** receives print job X, for example, the CPU **51** searches for the "incorrect paper size" folder, then searches within that folder for the "A4" folder matching the paper size in the print settings. The CPU **61** then saves print job X in the folder found through this search. If a folder matching the error details is not found, the CPU **51** may generate a new folder and save print job X in this new folder.

Alternatively, the CPU **51** may save print job X in a general-purpose folder, if such a folder exists. By sorting jobs being saved into different folders for each error type, the user can display the saved location of the print job using software or the like for managing folder structures, for example, and can easily infer the details of the error that occurred when executing the print job simply by checking the folder in which the print job is saved.

After print job X is saved on the server **200** in the printing system **900** of the preferred embodiment, the CPU **51** transmits print job X to another printer based on the transfer data appended to print job X. By transmitting print job X to another printer, the printing operation for print job X can be completed on the other printer.

In the preferred embodiment, there are two methods for having print job X printed on another printer. In the first method, the print job received from the MFP **100** includes transfer data. This transfer data includes data indicating another printer to which the print job should be transferred (the MFP **101** in the example of FIG. **2**). The server **200** automatically transfers the job to this other printer. The second method is a manual method in which the user of the other printer (the MFP **102** in the example of FIG. **2**) controls the printer to output a request to the server **200** in order to download print job X, and the server **200** transmits print job X to the other printer upon receiving the request. In the preferred embodiment, the first method is selected when transfer settings are provided with print job X, and the second method is selected when transfer settings are not provided.

More specifically, in the first method, the server **200** acquires data indicating the destination printer and the transfer time from the transfer data received from the MFP **100** or from transfer data stored in the server **200** itself. After saving print job X, the server **200** transmits print job X to the MFP **101** indicated as the destination printer after the transfer time has elapsed ((3) in FIG. **2**). Upon receiving print job X, the MFP **101** prints print job X. By waiting to transfer the print job until the transfer time has elapsed, the server **200** gives the user sufficient time to check the saved location of print job X in the server **200**. Hence, the first method can print the job on a desired printer while giving the user time to check details of the error. When the server **200** itself stores transfer data, the MFP **100** may not need to append transfer data to print job X. In the case that the server **200** stores transfer data and transfer data is also appended to print job X, the transfer destination specified in the transfer data appended to print job X takes precedence.

According to the second method, the MFP **102** accesses the server **200** to acquire information on a print job stored on the server **200**. The user operates the MFP **102** to select the desired print job X to be downloaded. After the user has selected print job X, the MFP **102** issues a request to the server **200** to download print job X ((4) in FIG. **2**). The MFP **102** then downloads print job X from the server **200** and prints print job X ((5) in FIG. **2**). According to the second method, the user can select the timing at which print job X stored on the server **200** is printed, and the printer to be used for printing print job X.

[Printing Process on the MFP]

Next, the operations performed on individual devices of the printing system **900** will be described. First, a printing process executed by the MFP **100** will be described with reference to the flowchart in FIG. **3**. The CPU **31** of the MFP **100** executes the printing process when a print condition for a print job has been satisfied in the MFP **100**. The print condition for a print job may be reception of a print job or input of a password for executing a print job, for example. The same process can be implemented both MFPs **101** and **102**.

In S**101** at the beginning of the printing process in FIG. **3**, the CPU **31** initiates a printing operation based on the print job for which the print condition was met. S**101** is an example of the execution of the job according to the present invention. In S**102** the CPU **31** determines whether the print has been completed. If the print was completed (S**102**: YES), the CPU **31** ends the current printing process. However, if the print was not completed (S**102**: NO), in S**103** the CPU **31** determines whether an error occurred that has restricted the print. S**103** is an example of the detection of the error according to the present invention. If such an error has not occurred (S**103**: NO), the CPU **31** returns to S**102** and repeats the above determinations in S**102** and S**103**.

However, if an error has occurred (S**103**: YES), in S**111** the CPU **31** halts the printing operation. In S**112** the CPU **31** determines whether it is necessary to upload the restricted print job to the server **200**. The CPU **31** may determine that the print job need not be uploaded to the server **200** if the error is a type that the server **200** cannot distinguish, for example. It is also possible to have the user configure settings in advance specifying particular errors as errors for which an upload is unnecessary. If uploading the print job is unnecessary (S**112**: NO), the CPU **31** is simply ends the current printing process without uploading the print job to the server **200**.

However, if an upload is required (S**112**: YES), in S**113** the CPU **31** determines whether the error was resolved. If the error has not been resolved (S**113**: NO), in S**114** the CPU **31** determines whether a wait time until the print job is to be automatically uploaded has elapsed.

With the MFP **100** of the preferred embodiment, there are cases in which errors can be resolved immediately after they have occurred, enabling the MFP **100** to resume printing. By waiting for a prescribed wait time before uploading the print job to ensure that the error has not been resolved, the MFP can reduce the number of jobs that are uploaded to the server **200** and thereby reduce the load on the server **200**. This wait time may be a fixed value, or may be a variable value that changes according to user settings and data sizes, for example. If a wait time has not been set, a wait time of zero is used as the default and, hence, the CPU **31** immediately determines in S**114** that the wait time has elapsed. When the error is resolved before the wait time elapses (S**113**: YES), in S**131** the CPU **31** resumes the print and returns to S**102**. The CPU **31** repeatedly performs the determinations in S**113** and S**114** while the wait time has not elapsed (S**114**: NO) and the error has not been resolved (S**113**: NO).

If the wait time elapses before the error is resolved (S**114**: YES), in S**121** the CPU **31** reconstructs the restricted print job. Specifically, the CPU **31** deletes data for pages that have already been printed from the restricted print job and generates a new print job configured of data only for unprinted pages. The new print job is then set as the print job to be uploaded to the server **200** since it is smaller in size and places less load on the server **200** than the original print job uploaded with all pages. S**121** is an example of the generation of the new job according to the present invention.

In S**122** the CPU **31** appends error data and transfer data to the reconstructed print job. The transfer data may be automatically acquired from print settings or may be acquired by prompting the user for transfer data in S**122**, for example. When transferring a print job according to the second method described above or when not performing a transfer, transfer data need not be appended to the print job.

In S123 the CPU 31 uploads the print job with appended error data and transfer data to the server 200. S123 is an example of the uploading the job and the error data according to the present invention. In S124 the CPU 31 deletes the print job just uploaded from the MFP 100 and ends the current printing process.

[Process for Saving an Error-Restricted Job on the Server]

Next a process executed by the server 200 to save a job for which an error occurred (hereinafter called an "error-restricted job") will be described with reference to the flowchart in FIG. 4. The CPU 51 of the server 200 executes the process for saving an error-restricted job upon receiving a print job that includes error data, i.e., a print job transmitted from an MFP in S123 of the printing process described above. The process for saving an error-restricted job is an example of the receiving the job according to the present invention. Further, when the print job also includes transfer data, the process for saving an error-restricted job is an example of the accepting the designation of the printer according to the present invention.

In S201 at the beginning of the process for saving an error-restricted job, the CPU 51 analyzes the error data appended to the print job. In S202 the CPU 51 saves the print job in a folder matching the error details based on the results of the analysis in S201. In other words, the CPU 51 sorts the print job received above based on the error data included with the print job and stores the job at a storage location matching the error details. S202 is an example of the storing the job according to the present invention.

In S203 the CPU 51 determines whether the transfer data indicates a transfer setting for the print job. Here, the CPU 51 gives priority to transfer data included in the print job when such transfer data exists. If the print job does not include transfer data, the CPU 51 acquires transfer data stored on the server 200. If the print job does not include transfer data and transfer data is not stored on the server 200, the CPU 51 determines that there are no transfer settings. Specifically, the CPU 51 determines that there are no transfer settings in the following two cases: (1) when transfer settings cannot be acquired, and (2) when transfer settings exist but indicate that a transfer is not to be performed. When there are no transfer settings (S203: NO), the CPU 51 ends the current process for saving an error-restricted job without transferring the print job from the server 200.

On the other hand, if transfer settings do exist (S203: YES), in S204 the CPU 51 determines whether a transfer time has elapsed. The transfer time may be an absolute time, or may be a relative time such as an elapsed time after the print job was received or saved. If the transfer time has not elapsed (S204: NO), the CPU 51 continues to wait for the transfer time to elapse.

When the transfer time has elapsed (S204: YES), in S205 the CPU 51 transmits the print job to the printer specified as the transfer destination. S205 is an example of the transferring the job according to the present invention. Further, S204 and S205 correspond to the process for implementing the first method described above. After completing the process in S205, in S206 the CPU 51 waits until a notification has been received from the destination printer indicating that the printing process has been completed before deleting the print job transmitted to the printer in S205 from the server 200. Subsequently, the CPU 51 ends the current process for saving an error-restricted job.

In this case, the destination printer receiving the transferred print job initiates a printing operation for printing the job. In this operation, the destination printer prints all remaining pages of the print job that were not printed on the MFP 100 before the job was cancelled.

[Process for Printing a Transferred Job on an MFP]

Next, a process executed by the MFP 100 for printing a job transferred from the server 200 will be described with reference to the flowchart in FIG. 5. The CPU 31 executes the process for printing a transferred job when the user performs an operation on the MFP 100 for shifting the MFP 100 into a download mode. The download mode is a mode in which the MFP 100 can download a print job saved on the server 200. Note that this process can also be performed on the MFP 101 and MFP 102.

In S151 at the beginning of the process for printing a transferred job, the CPU 31 acquires data stored on the MFP 100 itself. This data indicates what, if any, types of printing operations the MFP 100 is capable of performing and corresponds to data indicating the sizes of paper loaded in paper trays of the MFP 100 and data for colorants used in printing, for example. In S152 the CPU 31 issues a request to the server 200 to acquire data for print jobs saved on the server 200. Note that the processes in S151 and S152 may be performed in the reverse order or at the same time. S152 is an example of the requesting the jobs according to the present invention.

In S153 the CPU 31 determines based on the data acquired in S151 and S152 whether there are any print jobs saved on the server 200 that the MFP 100 can execute. For example, if a print job is saved in the "A4" folder within the "incorrect paper size" folder on the server 200, the CPU 31 determines that the MFP 100 can execute the print job when the MFP 100 has a paper tray for supplying A4-size sheets. If there are no print jobs saved on the server 200 that the MFP 100 can execute (S153: NO), in S171 the CPU 31 displays a message indicating that there are no executable print jobs. In S182 the CPU 31 cancels the download mode, and subsequently ends that process for printing a transferred job.

However, if there is a print job that the MFP 100 can execute (S153: YES), in S161 the CPU 31 displays a list of executable print jobs on the operating panel 40 and accepts a user selection for one of the displayed print jobs. S161 is an example of the accepting the execution command according to the present invention.

In S162 the CPU 31 determines whether a print command was issued while a print job was selected. If a print command was issued (S162: YES), in S163 the CPU 31 outputs a request to the server 200 to download the selected print job, and begins downloading the print job from the server 200. In S164 the CPU 31 initiates a printing operation based on the downloaded print job. In S165 the CPU 31 waits for the printing operation to be completed and, once the job is completed, issues a command to the server 200 to delete the print job downloaded in S163. Subsequently, the CPU 31 returns to S162 and waits for the next print command.

If a print command is not issued in S162 (S162: NO), in S181 the CPU 31 determines whether a command was issued to cancel the download mode. If a command was not issued to cancel the download mode (S181: NO), the CPU 31 returns to S162 and repeats the determinations in S162 and S181. If a command was issued to cancel the download mode (S181: YES), in S182 the CPU 31 cancels the download mode, and subsequently ends the process for printing a transferred job.

In the printing system 900 of the preferred embodiment above, when an error occurs on the MFP 100 while the MFP 100 is executing a print job, the MFP 100 uploads error data identifying details of the error to the server 200 in addition to the print job for which the error occurred. Upon receiving this data, the server 200 stores the print job on the HDD 54 in

association with the error data. Consequently, the user can easily infer what type of error occurred for any print job by viewing the print job stored on the server **200** using software or the like that is capable of displaying the structure of the storage location for the print job.

While the invention has been described in detail with reference to specific embodiments thereof, it would be apparent to those skilled in the art that many modifications and variations may be made therein without departing from the spirit of the invention, the scope of which is defined by the attached claims. For example, instead of the MFP **100**, the printer connected to the server **200** may be any device having a printing function, such as a copy machine, printer, or facsimile machine.

In the embodiment described above, the MFP **100** executes a printing process, and the MFPs **101** and **102** execute the process for printing a transferred job in order to print a print job according to the second method. However, since each MFP is capable of executing both the printing process and the process for printing a transferred job, the MFP **100** can also execute print jobs that are uploaded by the MFPs **101** and **102**. Further, if an error occurring on the MFP **100** while the MFP **100** is printing a job is subsequently resolved after the MFP **100** uploaded the print job to the server **200**, the MFP **100** itself may download the same print job and repeat the printing process for this print job.

Although the MFP **100** of the preferred embodiment reconstructs a print job for which printing has been restricted to produce a print job with only the unprinted portion of the job before uploading the print job, this reconstruction may be omitted. By not reconstructing the print job, the destination printer can reprint the entire job from the beginning. Thus, if the destination printer has a different printing quality from the printer on which the error occurred, for example, reprinting from the start ensures uniform printing quality on all pages of the print job.

The method of the preferred embodiment for storing a print job in association with error data involves generating a folder for each error type and saving the print job and related error data in the appropriate folder, but errors may be sorted using a database such as a registry, for example.

In the preferred embodiment, there are two possible methods for having print job X saved on the server **200** printed on another printer, but the printing system **900** may be limited to executing only one of these methods instead. Further, the MFP **100** itself may wait a prescribed time for the error to be resolved without transferring the print job to the server **200**. In other words, even if the MFP **100** does not have a function for transferring print jobs to the server **200**, the MFP **100** can still facilitate the user in confirming details of the error that occurred, provided that the MFP **100** has a function for saving the print job on the server **200** in association with error data.

The processes described in the embodiment may be executed by a single CPU, a plurality of CPUs, hardware such as an ASIC, or a combination of these components. Further, the processes described in the embodiment may be implemented according to various methods and using any of various storage media for storing programs used to execute the processes.

What is claimed is:

1. A printer comprising:
- a communication unit configured to communicate with a server;
- a printing unit; and
- a control unit configured to:
- receive a job from the server;
  - control the printing unit to execute the job;
  - terminate execution of the job upon detecting an error when the printing unit is executing the job;
  - determine whether it is necessary to upload the terminated job to the sever; and
  - when the control unit determines that it is necessary to upload the terminated job to the sever, upload the job to the server via the communication unit and send error data indicating details of the error to the server via the communication unit.

2. The printer according to claim **1**, wherein the control unit is configured to terminate the execution of the job and upload the job, send the error data when the error has interrupted the execution of the job by the printing unit.

3. The printer according to claim **1**, wherein, when the error is detected before the execution of the job is completed, the control unit is configured to generate a new job configured of data only for unprinted pages and upload the new job to the server.

4. The printer according to claim **1**, wherein the control unit is configured to upload the job when a wait time is elapsed after the detection of the error; and
- wherein the control unit is configured not to upload the job when the error is resolved before the wait time is elapsed.

5. A server comprising:
- a communication unit configured to communicate with a printer;
- a storage unit; and
- a control unit configured to:
  - receive a job and error data from the printer via the communication unit, the error data indicating details of an error that has occurred when the printer is executing the job, the details including one of a plurality of types of error data;
  - sort the job based on the type of error data; and
  - store the job with the error data at a storage location matching the type of error data in the storage unit.

6. The server according to claim **5**, wherein the control unit is configured to store the job when the error has interrupted execution of the job by the printer.

7. The server according to claim **5**, wherein the storage location is a folder having a name matching the type of error data and the control unit is configured to display the folder name.

8. The server according to claim **5**, wherein the error data includes at least one of data indicating a size of paper and data indicating color of colorants used in executing the job.

9. The server according to claim **5**, wherein the communication unit is configured to communicate with a plurality of printers; and
- wherein the control unit is further configured to:
  - accept a designation of a printer selected from the plurality of printers for executing the job and a designation of a transfer time at which the job is transferred to the designated printer; and
  - transfer the job stored in the storage unit to the designated printer upon elapse of the transfer time.

10. A printing system comprising: a server; and a printer,
- wherein the printer comprises:
  - a printer communication unit configured to communicate with the server;
  - a printing unit; and
  - a printer control unit configured to:
  - control the printing unit to execute a job;
  - terminate execution of the job upon detecting an error when the printing unit is executing the job; and

upload the job and error data to the server via the printer communication unit, the error data indicating details of the error that has occurred when the printer is executing the job, the details including one of a plurality of types of error data; and

wherein the server comprises:

a communication unit configured to communicate with a printer;

a storage unit; and

a control unit configured to:

receive the job and error data from the printer via the communication unit;

sort the job based on the type of error data; and

store the job with the error data at a storage location matching the type of error data in the storage unit.

* * * * *